PEDiATRIC HEADACHES

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Disclosure Statement

• Nothing to disclose
Pediatric Headaches

- Headaches are common in the pediatric population
  - Approximately 1/3 - 1/2 have recurrent headaches
  - 2 - 6% have headache on a daily or near daily basis
  - Migraine often begins in childhood
    - Cumulative lifetime incidence of migraine is estimated to be 43% for women and 18% for men (Stewart et al. Cephalalgia. 2008 Nov;28(11):1170-1178)
      - Median age of onset is 25 years for women and 24 years for men
      - Peak incidence is 20-24 years for women and 15-19 years for men
Pediatric Headaches

• There are many types of headaches and many disease processes that produce headaches
• Early and appropriate diagnosis and treatment may improve quality of life
  • Missed school, missed recreational activities, missed work
• Problem – most studies of headaches exclude individuals < 18 years of age
Pediatric Headaches

• Evaluation
  • Goal – determine primary vs. secondary
    • Primary – the headache is the disease state
    • Secondary – caused by an identifiable or presumed etiology
  • ICHD 3
    • Part 1 – primary headaches
    • Part 2 – secondary headaches
    • Part 3 – painful cranial neuropathies, other facial pain and other headaches
    • Appendix
Pediatric Headaches

• Primary Headaches
  • Migraine
  • Tension-type
  • Trigeminal autonomic cephalalgias (TACs)
    • Cluster, SUNCT, SUNA, paroxysmal hemicrania, hemicrania continua
  • Other primary headaches
    • Primary cough headache, primary exercise headache, primary headache associated with sexual activity, primary thunderclap headache, cold-stimulus headache, external-pressure headache, primary stabbing headache, nummular headache, hypnic headache, new daily persistent headache
Pediatric Headaches

• Secondary Headaches
  • Attributed to: trauma or injury of head or neck, vascular disorder, increased CSF pressure, low CSF pressure, inflammatory disease, intracranial neoplasm, intrathecal injection, brain malformation, epileptic seizure, use of or exposure to a substance or its withdrawal, medication overuse, infection (intracranial or systemic), disorder of homeostasis, disorder of the head or neck, or psychiatric disorder.
  • ~ 90% are caused by viral or strep URI
  • Treat the underlying cause
History and Physical

• Good description of the headache
  • Where does it hurt? What is the pain like? How severe is the pain? How long does it last? What helps? What makes it worse? How often do they occur?
  • Triggers
  • Warning signs
  • Associated symptoms
  • Family history

• Comorbidities
  • Psychiatric and systemic diseases
History and Physical

• Examination
  • General
  • Neurological
    • Attention to eyes
Red Flags

- Systemic symptoms
  - Fever, weight loss, chronic medical comorbidities
- Other neurological symptoms
  - Unusual or prolonged aura, confusion/alteration of consciousness, seizure
- Exclusively occipital headache
- Frequent early morning headaches
- Headaches that awaken from sleep
- New severe headache
- Change in headache type
- Abnormal examination
Testing

- MRI
  - Generally superior to CT
- MRA
  - When concerned about a vascular disorder
- MRV
  - When concerned about thrombosis
- LP
  - When concerned about increased intracranial pressure, infection
- No consensus on routine labwork
  - Individualized, based on other symptoms
- CT
  - In the ED
- EEG
  - Atypical symptoms concerning for seizure
Case 1

- 12 year girl.
- 2 year history of headaches.
- Occur every 1-2 months.
- The pain is bitemporal and pounding in quality.
- She avoids bright lights and loud noises during the headache. Sometimes she vomits.
- Half of the time she sees a small blurry smudge in her right hemifield that becomes bigger and develops zig zag brightly colored lines around it. The visual change gradually resolves within 45 minutes. The headache usually begins 30 minutes after the onset of visual symptoms.
- Her mother and maternal grandmother have migraines.
Case 1
Case 1
Migraine
Migraine

- The most common headache type to present to a primary care provider or a neurologist
  - Prevalence
    - 3% - 3-7 year old
    - 4-11% - 7-11 year old
    - 8-23% - 11-15 year old
- Probably the second most common primary headache disorder
- Gender varies with age
  - 3-7 year old, male > female ~1.5:1
  - 7-12 year old, equal
  - >12 year old, female > male ~3:1
Migraine

- WHO-migraine the third most common and the seventh most disabling illness in the world
- Cost to society in the US exceeds $20 billion annually
- Comorbidities
  - Psychiatric disorders
  - Cardiovascular disorders
  - Metabolic disorders
  - Gastrointestinal disorders
  - Sleep disorders
  - Other neurological disorders
Migraine

• Subtypes
  • Without aura
    • Most common
  • With aura
    • ~ 20-30%
    • Typical
      • With or without headache
  • Brainstem aura
  • Hemiplegic
    • Familial or sporadic
  • Retinal
Migraine

• Subtypes (cont)
  • Chronic
  • Complications of Migraine
  • Probable
  • Episodic syndromes that may be associated with migraine
Migraine Without Aura

Criteria:

- A) At least 5 attacks fulfilling B-D
- B) 2-72 hour duration (4-72 for adults)
- C) At least 2 of the following characteristics:
  - 1) unilateral, 2) pulsating, 3) moderate or severe, 4) aggravated by routine physical activity
- D) At least one of the following during the headache:
  - Photophobia and phonophobia
  - Nausea or vomiting
- E) Not better explained by another ICHD-3 diagnosis
ID Migraine

- ID Migraine Questionnaire (Lipton et al. Neurology. 2003.61;375-382)
  - 3 yes or no questions, focusing on disability, nausea, and photophobia:
    - 1) Has a headache limited your activities for a day or more in the last 3 months?
    - 2) Are you nauseated or sick to your stomach when you have a headache?
    - 3) Does light bother you when you have a headache?
  - Yes to 2 out of 3 is positive
  - Sensitivity – 81%, Specificity – 75%
Migraine With Aura

Criteria:

• A) At least 2 attacks fulfilling B and C
• B) Aura consisting of visual, sensory and/or speech/language symptoms, each fully reversible, but no motor, brainstem or retinal symptoms
• C) At least 2 of the following 4 characteristics:
  • 1) At least one symptom spreads over > 5 min, and/or 2 or more symptoms occur in succession, 2) each symptom lasts 5-60 min, 3) at least one symptom is unilateral, 4) aura is accompanied, or followed within 60 min, by headache
• D) Not better accounted for by another ICHD-3 diagnosis, and TIA has been excluded
Migraine With Aura
Migraine With Aura
Case 2

- 15 year old boy with a 5 year history of headaches.
- They involve his right hemicranium, are moderate/severe and are pounding/pulsating.
- Activity makes them worse.
- He has photophobia but no phonophobia. No nausea or vomiting.
Probable Migraine

• A) Attacks fulfilling all but one of criteria A-D for Migraine without aura or all but one of criteria A-C of Migraine with aura
• B) Not fulfilling ICHD-3 criteria for any other headache disorder
• C) Not better accounted for by another ICHD-3 diagnosis
Chronic Migraine

• A) Headache (tension-type-like and/or migraine-like) on ≥ 15 days per month for > 3 months and fulfilling criteria B and C

• B) Individual has had at least five attacks fulfilling criteria B-D for Migraine without aura and/or criteria B and C for Migraine with aura

• C) On ≥ 8 days per month for > 3 months, fulfilling any of the following:
  • 1) Criteria C and D for Migraine without aura, 2) criteria B and C for Migraine with aura, 3) believed by the patient to be migraine at onset and relieved by a triptan or ergot derivative

• D) Not better accounted for by another ICHD-3 diagnosis
Complications of Migraine

• Status migrainosus
  • >72 hours

• Persistent aura without infarction
  • Aura symptoms ≥ 1 week without evidence of infarction on neuroimaging

• Migrainous infarction
  • One or more aura symptom associated with an ischemic brain lesion on neuroimaging

• Migraine aura-triggered seizure
Episodic Syndromes That May Be Associated With Migraine

- Recurrent gastrointestinal disturbance
  - Cyclic vomiting syndrome
  - Abdominal migraine
- Benign paroxysmal vertigo
- Benign paroxysmal torticollis
- Appendix:
  - Infantile colic
  - Alternating hemiplegia of childhood
  - Vestibular migraine
Case 3

- 6 year old girl.
- Headaches most Mondays and Tuesdays for the past 1-2 years.
- Hurts really bad on top of her head.
- Feels sick but doesn’t throw up.
- Likes to lay in a dark room when they occur.
- Ibuprofen and acetaminophen help but she often refuses to take them.
Case 3
Migraine Treatment
Treatment

• Lifestyle measures
  • Regular exercise
  • Regular meals
  • Adequate hydration
  • Adequate sleep
  • Stress management
Treatment

- Abortive/symptomatic
  - Most require

- Preventive/prophylactic
  - More than 2-4 headaches per month
  - Individualized - comorbidities, preferences
AAN Evidence-Based Guidelines for the Acute Treatment of Migraine in Children and Adolescents

• **Strong evidence supports**
  • Ibuprofen is effective for acute treatment of migraine in children
  • Sumatriptan nasal spray is effective for acute treatment of migraine in adolescents

• **Good evidence supports**
  • Acetaminophen is probably effective for the acute treatment of migraine in children
AAN Evidence-Based Guidelines for the Preventive Treatment of Migraine in Children and Adolescents

- Good evidence supports
  - Flunarizine is probably effective for preventive therapy but is not available in the US
  - Pizotifen, Nimodipine and Clonidine are NOT effective and are NOT recommended
AHS-Acute Treatment of Migraine in Adults

• Level A evidence of efficacy:
  • Specific medications:
    • Triptans
      • Sumatriptan, zolmitriptan, naratriptan, rizatriptan, almotriptan, eletriptan, frovatriptan
    • Dihydroergotamine nasal spray
  • Nonspecific medications:
    • NSAIDS
    • Acetaminophen
    • Opioids
      • Regular use is not recommended
    • Sumatriptan/naproxen
    • Acetaminophen/ASA/caffeine
AHS-Acute Treatment of Migraine in Adults

• Level B evidence of efficacy
  • Antiemetics:
    • Prochlorperazone, chlorpromazine, metoclopramide, droperidol
Abortive/Symptomatic Treatment

- Principles
  - Use early
  - Give an adequate dose
  - Avoid overuse
  - Avoid opiates and barbiturates
Preventive/Prophylactic Treatment

• When?
  • Frequent headaches
  • Overuse of abortive treatments
  • Severe/debilitating headaches

• Goals
  • Reduce the number and severity of headaches
  • Reduce the use of abortive medications
  • Improve the response to abortive medications
AAN-Treatment for Migraine Prevention in Adults

- **Level A**
  - Beta blockers
    - Propranolol, metoprolol, timolol
  - Anticonvulsants
    - Topiramate, valproic acid
  - Butterbur (Petasites)

- **Level B**
  - Antidepressants
    - Amitriptyline, venlafaxine
  - Magnesium
  - Riboflavin
  - Feverfew

- **Level C**
  - Cyproheptadine
  - Coenzyme Q10
Preventive/Prophylactic Treatment

• Principles
  • Set realistic goals
  • Start with a low dose
  • Escalate the dose until symptoms improve
  • Give an adequate trial
Case 4

- 11 year old boy.
- Headaches for the past 2 or 3 years.
- Occur a couple of times a month.
- Bitemporal dull pain that can last up to 2 days
- Moderate intensity.
- Has some sound sensitivity when they occur but otherwise is able to do routine activities.
Tension-Type Headache
Tension-Type Headache

- Probably the most common headache type
  - Prevalence in the general population of 30-78%
- Often triggered by physical or mental stress
- Types:
  - Infrequent episodic tension-type headache
  - Frequent episodic tension-type headache
  - Chronic tension-type headache
  - Probable tension-type headache
- New onset TTH requires careful investigation to rule out secondary cause (many secondary headaches have tension type features)
Infrequent Episodic Tension-Type Headache

- A) At least 10 episodes of headache occurring on < 1 day/month on average (<12 days/year) and fulfilling B-D
- B) Lasts 30 minutes to 7 days
- C) At least two of the following:
  - 1) bilateral, 2) pressing or tightening quality, 3) mild to moderate, 4) not aggravated by routine physical activity
- D) Both of the following:
  - 1) no nausea or vomiting, 2) no more than one of photophobia or phonophobia
- E) Not better accounted for by another ICHD-3 diagnosis
Frequent Episodic Tension-Type Headaches

- A) At least 10 episodes of headache occurring on 1-14 days/month on average for > 3 months and fulfilling B-D
- B) Lasting from 30 minutes to 7 days
- C) At least 2 of the following 4 characteristics:
  - 1) bilateral, 2) pressing or tightening quality, 3) mild or moderate, 4) not aggravated by physical activity
- D) Both of the following:
  - 1) no nausea or vomiting, 2) no more than one of photophobia or phonophobia
- E) Not better accounted for by another ICHD-3 diagnosis
Chronic Tension-Type Headache

- A) Headache occurring on $\geq 15$ days/month on average for $> 3$ months, fulfilling B-D
- B) Lasting hours to days, unremitting
- C) At least 2 of the following 4 characteristics:
  - 1) bilateral, 2) pressing or tightening quality, 3) mild or moderate, 4) not aggravated by physical activity
- D) Both of the following:
  - 1) no more than one of photophobia, phonophobia or mild nausea, 2) neither moderate or severe nausea nor vomiting
- E) Not better accounted for by another ICHD-3 diagnosis
Treatment of Tension-Type Headaches

• Probably most do not require treatment
• Similar treatment plan to migraine
  • Lifestyle interventions
  • Acute/symptomatic treatment
    • NSAIDS
  • Preventive treatment
    • Amitriptyline
Summary

- Headaches are common in children
- Distinguish between primary and secondary headaches
  - Migraine is the most common primary headache disorder seen in the office
  - Most secondary headaches are caused by URI
  - Pursue further testing if there are red flags
- Migraine treatment
  - Lifestyle measures
  - Acute/symptomatic/abortive
  - Preventive/prophylactic
Resources

• ICHD-3

• AAN
  • https://www.aan.com/Guidelines/Home/GetGuidelineContent/545
  • https://www.aan.com/Guidelines/Home/GetGuidelineContent/538

• AHS
Resources

- Taking the Headache Out of Migraine. Borsock D, Dodick DW. Neurology: Clinical Practice, August 2015